

PREVALENCE OF POLYCYSTIC OVARIAN SYNDROME AMONG STUDENTS OF RAK MEDICAL AND HEALTH SCIENCES UNIVERSITY UNITED ARAB EMIRATES

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ABSTRACT

Introduction

Gynecological diseases are quite common in adolescent females, most of them ignore the symptoms or they are unaware, till the time the problem really worsens. One of them is polycystic ovarian syndrome (PCOS). Several studies conducted globally projecting prevalence of PCOS 8-33%; however there is limited data from middle east countries.

Materials and Methods

A prospective cross-sectional study was undertaken after the ethical approval in Ras AL Khaimah Medical and Health Sciences University (RAKMHSU) to assess the prevalence of polycystic ovarian syndrome (PCOS) among 250 adolescents girls aged 15-24 years.

Results

Mean age of subjects was 19.76 ± 1.68 years. The prevalence of PCOS was 27.6% (69 students) diagnosed by National Institute of health (NIH) criteria. Evidence of Clinical hyperandrogenism (androgen excess) was reported as hirsutism-56.5%, Alopecia-43.4%, Acne 49.3 %, Acanthosis-42%.

PCOS subjects, having normal body mass index (BMI) were 46 (65.2%), overweight 13 (18.8%) obese 11 (15.9%). waist circumference, <80cm 45 (65.2%) >80cm 24 (34.7%).

PCOS group was also studied in relation to possible risk factors like family history 42 (60.9%) smoking 1 (1.45%), alcohol (0), fast food 64 (92.8%) and Exercise 50 (72.5%)

Conclusions

This study demonstrates high prevalence of PCOS suggesting it is an emerging disorder during adolescence. Obesity is present in more than one third of patients with PCOS. This draws attention to the

issue of early screening, diagnosis in adolescent girls and educating them for promoting healthy lifestyles and early interventions to prevent future morbidities

KEYWORDS: Polycystic Ovary Syndrome (PCOS) Hirsutism (H), Acne, Oligomenorrhea, Body Mass Index (BMI)

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INTRODUCTION

The polycystic ovary syndrome (PCOS) appears to be one of the most common endocrine disorders of women [1. Hacker Neville F.et.al 2012] Moreover, PCOS is associated with significant reproductive, endocrine, metabolic, and cardiovascular, morbidity [2 2. Carmina E.2004].

The transformation, from child to adolescence is a journey with full of challenges, both for the parents and the children. Gynecological diseases are quite common but most of the adolescent females ignore the symptoms or they are unaware, till the time the problem really worsens. One of them is polycystic ovarian syndrome (PCOS).

The National Institute of Health (NIH) diagnostic criteria for polycystic ovarian syndrome (PCOS) is based on following:

- A menstrual cycle that ranges from > 35 days or < 8 cycles/year (oligomenorrhea), to complete absence of menses (amenorrhea).
- Evidence of androgen excess, such as acne, hirsutism, alopecia, Acanthosis Nigricans (dark hyperpigmented hyperplasia of the skin typically found at the nape of the neck and axilla, is a marker for insulin resistance. Acanthosis Nigricans is usually found in about 30% of hyperandrogenic women) anovulation or increased androgen levels on laboratory testing.[1,2,3 Hacker Neville F.et.al 2012, Carmina E.2004, Rotterdam 2004]

This criterion was broadened in the 2003 as Rotterdam criteria to include PCO findings at ultrasound.

The diagnosis of PCOS has life-long implications with increased risk for infertility, metabolic syndrome (dyslipidemia, hypertension), type 2 diabetes mellitus, and possibly cardiovascular disease and endometrial carcinoma. [4. Azziz R, et.al 2006, 5.Diamanti-Kandarakis E, Kouli et.al 1999]

Relationship between Diabetes Mellitus and PCOS

Women with PCOS are at higher risk of developing diabetes mellitus type 2 because of the relative insulin resistance. Also, these women tend to develop diabetes earlier in life, around the third or fourth decade. [4. Azziz R, et.al 2006, 5. Diamanti-Kandarakis E, Kouli et.al 1999]

Relationship of Cardiovascular Disease to PCOS

Women who are hyper androgenic and hyperinsulinemic are at increased risk for dyslipidemia, coronary artery disease, hypertension, and diabetes mellitus. The most common lipid abnormalities found in obese PCOS patients are decreased high-density lipoprotein and elevated triglycerides. In addition to the lipid abnormalities seen in women with PCOS, these patients are 7 times more likely to have a myocardial infarction. [3, Rotterdam 2004, 13.Tehrani FRet.al 2011,

14.Rosenfield RL.et.al 2008] Because cardiovascular disease is the leading cause of death of among women, prevention is essential.

A cross-sectional study was conducted at University of Sharjah in United Arab Emirates between January 2012 and June 2012. They reported prevalence of PCOS (20%), based on ultrasound findings, which was consistent with global prevalence of PCOS (8-33%) in women of reproductive age based on Rotterdam criteria. Several other studies in American and European countries using NIH criteria estimated the prevalence of PCOS at a range of 6-8%. [5-11 Diamanti-Kandarakis E, et.al . 1999, Knochenhauer ES, et. al. 1998 , Asuncion M, et.al. 2000, March WA, et.al 2010 , Lindholm A, et.al 2008 , Chen X, et.al 2008 , Kumarapeli V, et.al 2008]. Only few studies were done to estimate the prevalence of PCOS in the Middle East; two large Iranian studies found prevalence to be around 7%. [12. Mehrabian F, et.al 2011, 13.Tehrani FR et.al 2011].

OBJECTIVES OF THE STUDY

- To determine the prevalence of PCOS among female university students of RAKMHSU according to the National Institute of health (NIH) criteria.
- To accesses the risk factors associated with PCOS.

MATERIALS AND METHODS

A cross sectional study was conducted after ethical approval, aimed to assess the prevalence of the PCOS in 250 female adolescent students of RAKMHSU, with age group (18–24) years was conducted using simple random sampling method.

Structured knowledge questionnaire was administered to collect the data from RAKMHSU, university students. The questionnaire consists of 7 sections A (Demographic details) B (Personal Information) C (Symptoms) D (Physical signs) E (Emotions) F (Family history) G (Anthropometric measurements) H (Risk factors) with items related to polycystic ovarian syndrome. PCOS cases were identified based on the National Institute of health (NIH) criteria.

Sampling method: Required target sample size is 250 RAKMHSU students will be selected using simple random sampling technique from Population size of 700 with Confidence level of 95% and Margin of error 5% power of study will be 80%. Response distribution 50% Acceptable level of significance will be at P value < 0.05.

Inclusion Criteria:

- Female Students aged 18-24 years studying at RAKMHSU only
- Students who agreed to participate.

Exclusion Criteria:

- Having diabetes using hypoglycemic drugs.
- Taking oral contraceptives for irregular periods.

All the statistical analysis was carried out using SPSS software version 18 and a p value of less than 0.05 was considered as statistically significant.

RESULTS

250 subjects agreed to participate in the study, Mean age of subjects was 19.78 years. The prevalence of PCOS was 27.6% (69 students) diagnosed by National Institute of health (NIH) criteria.

Table 1

Using the NIH criteria, PCOS was defined as the combination of chronic anovulation (ANOVU) and clinical hyperandrogenism (HA).

ANOVU was considered as vaginal bleeding episodes at no less than 35-day intervals or < 8 cycles/year to complete absence of menses (amenorrhea, oligomenorrhoea, irregular cycles) [36,37 Chiazz L Jr, et.al, Treloar AE, et.al]. HA was determined as clinical hyperandrogenism (CH) and/or biochemical hyperandrogenemia (BH). In this study CH was taken as criteria which are defined by the presence of hirsutism androgenic alopecia, acne and acanthosis.

Table 1: Patients with Polycystic ovary Syndrome Who Met Diagnostic Criteria According to the National Institute of Child Health

Criteria	N (%) 69 (100%)
Menstrual irregularities	69 (100%)
Hirsutism	39 (56.55%)
Alopecia	30 (43.5%)
Acne	34 (49.3%)
Acanthosis	29 (42.0%)

*Values are raw numbers (percentages)

Table 2: Anthropometric Characteristics of the Study Sample in Relation to PCOS

BMI (Body Mass Index)	PCOS Group (69) %
Normal BMI PCOS (18.5-24.9)	45 (65.2%)
Overweight PCOS (25–29.9)	13 (15.9%)
Obese PCOS (equal or more than30)	11 (16%)
Waist circumference <80cms Normal >80cm abnormal	45<80cms (65.2%) 24>80cms (34.7%)

*Values are raw numbers (percentages)

Table 3: Relation of Normal BMI and Waist Circumference (WC)

BMI	
PCOS Normal BMI (Body mass index) (18.5-24.9)	45 (65.2%)
Waist circumference	
<80cms Normal	42 (93.33%)
>80cm abnormal	3 (6.6%)
BMI	
Overweight PCOS (25–29.9)	13 (15.9%)
Waist circumference	
<80cms Normal	2
>80cm abnormal	11

Table 3: Contd.,	
BMI	
Obese PCOS (equal or more than 30)	11 (16%)
Waist circumference	
<80cms Normal	1
>80cm abnormal	10

Body Mass Index (BMI) will be calculated by the formula: weight (kg)/height² (m²). (The BMI classification criteria used will be those provided by the World Health Organization [18 WHO. Physical status: the use and interpretation of anthropometry.1995], which are: low-weight under 18.5kg/m², normal weight 18.5 to 24.9kg/m², overweight 25 to 29.9kg/m², and obesity equal to or higher than 30kg/m² (level I 30 to 34.9kg/m²; level II 35 to 39.9kg/m², and level III > 40kg/m²).

Waist and hip circumferences will be measured with an inelastic metric tape, with the student in the upright position, arms along the body and feet together. (The cut-off points used for waist circumference were those recommended by WHO [18], which classifies it as high when the value in centimeters is equal to or higher than 80cm for females, and equal to or higher than 94cm for males. A value equal to or higher than 88 cm for females and 102 cm for males is considered very high). [18. WHO. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series 854. Geneva: World Health Organization, 1995.]

Correlation between BMI and WC was analyzed using spearman correlation test. Highly significant correlation was observed with ($r=0.798$) in our study.

Table 4: Risk Factors in PCOS in the Study Sample

Criteria	PCOS N: 69 (%)
Family history	42 (60.9%)
Smoking	1 (1.45%)
Alcohol	0
Fast food	64 (92.8%)
Exercise	50 (72.5%)

PCOS group were studied in relation to many possible risk factors including family history smoking, alcohol, fast food and Exercise.

Correlation between fast food and BMI was analyzed using spearman correlation test was ($r=0.105$) no statistical significant was observed in our study.

Correlation between exercise and BMI was analyzed using spearman correlation test was ($r=0.039$) no statistical significant was observed in our study.

Familial aggregation of PCOS strongly supports a genetic susceptibility to this disorder. [1 Sam S, Dunaif A. 2003] Considering the close association between PCOS and obesity, it is likely that similar or interrelated genes may also predispose to obesity in affected women. No doubt environmental factors (high-caloric diets and reduced exercise) also play a major role in the high prevalence of obesity in women with PCOS.

When we explored possible risk factors for PCOS, 60.9% were found to have strong family history, 72.5% of them were doing physical activity. However 64% of them were eating fast food either 1-7 times per week.

DISCUSSIONS

The reported prevalence of PCOS using the NIH criteria, in various geo-graphic regions ranges between 2.2% to 26%. The PCOS prevalence depends on the recruitment process of the study population, the criteria used for its definition [1,11-21 Aziz R, et.al, 2004, March WA, et.al 2010, 25:544-551, Azziz R:PCOS: 2004, Barth JH, et.al 2007, Chen X, et.al 2008, Goodarzi MO, et.al 2005, Knochenhauer ES, et.al 1998, Michel more KF, et.al 1999, Asuncion M, et.al 2000, Diamanti-Kandarakis et.al 1999, Farah L, et.al , 1999, Kumarapeli V, et.al 2008]

PCOS prevalence depends on the recruitment process of the study population and criteria used for its definition; using NIH criteria, two Iranian studies found PCOS prevalence to be 7.1% and 7%. The first was done in 2011 on a community sample of age group 18–45 years [12], and the second one was done in 2009 in Isfahan among females referred to the mandatory pre-marriage screening clinic of age 17–34 years [13].

Using same criteria for diagnosis in other parts of the world found a close range of PCOS prevalence; examples are Australia 8.7%, Spain, 6.5%, Greek Island of Lesbos 6.7%, the southeastern United States 4%, and Sweden 4.8% South china,(2.4%)south Australia, (17.8) India,(46.8%) Kerala (26. 4) [5-95. Diamanti-Kandarakis E, et.al. 1999 , Knochenhauer ES, et.al 1998, Asuncion M, et.al 2000 , March WA, Moore VM, et.al 2010 , Lindholm A, Anderson L, et.al 2008]. 28.3% prevalence of PCOS in overweight and obese women from Spain [30 Francisco Álvarez et.al 2006]

The prevalence of PCOS at RAKMHSU in age groups 18–24 years was found to be 27.6%.which is consistent with global prevalence in obese PCOS.

Obesity is present in more than half of patients with PCOS. [11 Gambineri APelusi et.al 2002] This finding is because obesity is a major contributor to insulin resistance, and secondary hyperinsulinism favors hyperandrogenism and PCOS.(10 Dunaif A et.al 1997)

Androgens play an important role in determination of body composition. Men have less body fat with greater distribution of fat in the upper portion of the body (android) compared to women, who tend to accumulate fat in the lower portion of the body (gynoid). Vague first reported that the prevalence of diabetes, hypertension, and atherosclerosis was higher in women with android obesity compared to gynoid obesity.[9 Vague J. 1956] Moreover, he observed that the prevalence of android body habitus increases in women after the age of menopause and women with android obesity tend to have features of hyperandrogenism such as hirsutism.9 Women with upper-body obesity have also been noted to have decreased insulin sensitivity and are at higher risk for cardiovascular disease and diabetes. Independent of BMI, women with PCOS have been reported to have a high prevalence of upper-body obesity as demonstrated by increased waist circumference and waist-hip ratio compared to BMI-matched control women. [10 Douchi T, et.al 1995]

In our study BMI values were normal in 65.2%, over weight in 18.8%, 15.9% were obese. Waist circumference, <80cms in 65.2% and >80cms in 34.7%.

However abnormal BMI and WC were seen in 24 subjects, indicating high incidence of android obesity increasing the prevalence of PCOS.

CONCLUSIONS

PCOS prevalence is relatively high among young RAKMHSU students; the prevalence is similar to Mediterranean, Caucasian and south East Asia populations. Further larger studies are needed to improve diagnosis and

control of this common women health problem. The best way of prevention is through a healthy life style modification to eating, weight loss, and exercise is encouraged for the management of the female adolescent with PCOS and thereby reduce the risk of type 2 diabetes mellitus and cardiovascular disease.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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